These Builder Option Packages are exclusive to the states of:
Washington, Oregon, Idaho, & Montana
All requirements listed on pages 2 and 3 must be met.

Instructions for Using ENERGY STAR® Builder Option Packages

Builder Option Packages (BOPs) are a prescriptive method for labeling new homes ENERGY STAR. BOPs specify levels and limitations for the thermal envelope (insulation and windows), HVAC and water heating equipment efficiencies for the Pacific Northwest. BOPs require a third-party verification, including testing the leakage of the envelope and duct system, to ensure the requirements have been met. Follow these steps to build an ENERGY STAR labeled home using a BOP:

1. To find the BOP, visit the ENERGY STAR Web site at www.energystar.gov/homes. Link to "Builder Option Packages" under Technical Resources, then link to "Find a BOP". Check the website regularly to ensure that you are using the most current available version.

2. Choose the state and county where the home will be built, and open the File. Opening the BOP files requires Adobe Acrobat Reader; a free version of Adobe Acrobat Reader can be downloaded from www.adobe.com.

3. Identify the package (i.e., BOP Number) that you are interested in building. There may be more than one page of BOPs to choose from, depending on your location. Make sure that the house you are building meets the limitations of the package. For example, if the prospective home has 16% window to floor area, the BOP selected must meet or exceed the corresponding limitation - i.e., choose a BOP that allows </= 18% or 21% window to floor area.

4. Build the home, following all the BOP specifications. For clarification on certain items please read the attached "Footnotes" section.

5. Contact a BOP verifier to get your home inspected and labeled ENERGY STAR. BOP verifiers can be located by visiting the ENERGY STAR Web site at www.energystar.gov/homes and linking to "New Homes Partner Locator" under Locator Resources. Verifiers are listed as Home Energy Raters on the New Homes Partner Locator.

6. The BOP provider will send a BOP inspector to verify the home meets or exceeds all requirements listed in the BOP. Verification of the home typically includes testing the air leakage of the envelope and duct system. If the home complies with the BOP, the inspector will sign and date the BOP sheet. This sheet is then filed with the BOP Providers for their records

7. For home buyers interested in an ENERGY STAR mortgage, Fannie Mae requires estimated monthly energy cost savings. For BOPs, these estimates are determined using the monthly cost savings table developed for each climate zone, such as the table below. To use this table:

   - Choose the appropriate package and location that most closely fits the home being built and locate the estimated monthly savings.
   - Insert the estimated monthly cost savings in the appropriate line at the bottom of the BOP sheet. Note that these estimated savings should NOT be used as basis for guaranteeing utility bills. This should only be done on a case by case basis with a qualified energy modeling tool.
   - Submit a copy of the signed BOP, which includes the estimated monthly cost savings, with your loan request forms, and indicate your interest in receiving an ENERGY STAR label.

Estimated Monthly Energy Savings Table: Pacific Northwest Reference Climates*					
	From Oregon Code Standards ($)				
BOP Package	Portland	Seattle	Boise	Spokane	Missoula
1	16	15	26	26	31
2	22	21	54	61	78
3	6	9	29	41	50

* Based on a 2200 square foot prototype home

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Builder Name:_____

House Address:_____ City:_____ State:_____

Additional BOPs for the states of Washington, Oregon, Idaho, & Montana [1]

BOP Selected	BOP Number	Window Requirements			Minimum Insulation Requirements[3]							Minimum Equipment Requirements[4]					
												Gas Furnace Htg / Elec Clg		Electric Htg / Electric Clg[11]		DHW	
		Maximum Window Area[5]	Window U-value	Window SHGC[6]	Attic[3]	Exterior Wall[3]	Floor Above Unheated Space[2]	Basement Wall[3]	Slab[12]	Crawlspace Wall[2]	Doors[13]	Heat (AFUE)	Cool (SEER)	Heat (HSPF)	Cool (SEER)	Gas (EF)	Elect. (EF)
	1	21%	</= 0.35	</= 0.50	R- 38	R- 21	R- 30	R- 19	R- 10	-	R- 5	90%	13*	--	--	0.61	0.93
	2	21%	</= 0.35	</= 0.50	R- 38	R- 21	R- 30	R- 19	R- 10	-	R- 5	--	--	8.0	13*	0.61	0.93
	3	21%	</= 0.30	</= 0.50	R- 38	R-21+2.5	R- 30	R- 19	R- 10	-	R- 5	--	--	Any	13*	0.61	0.93

Note: * Minimum equipment requirement for cooling (SEER) only applies when air conditioning is installed.

	Additional Requirements					
	Housing Type	Equipment			Envelope Infiltration[8]	Thermostat[9]
		Duct Leakage[7]	Duct Insulation[10]	Ventilation[8]		
1	Site-built	</= 6% leakage (CFM/CFM) to uncond. spaces at 25 Pascals; field verified	R-8 for ducts in unconditioned spaces	Active Ventilation Recommended	</= 7.0 ac/h @ 50 Pa	Manual
2	Site-built	</= 6% leakage (CFM/CFM) to uncond. spaces at 25 Pascals; field verified	R-8 for ducts in unconditioned spaces	Active Ventilation Recommended	</= 7.0 ac/h @ 50 Pa	Manual
3	Site-built	N/A	R-8 for ducts in unconditioned spaces	0.25 ac/h with 70% heat recovery	</= 2.5 ac/h @ 50 Pa blower door tested	Manual Zone Controlled

BOP Provider Company's Name: _____ BOP Provider's Address: _____

BOP Provider Phone number: _____ _____

BOP Inspector's Name: _____ BOP Inspection Company's Name: _____

Inspection Date: _____ Estimated Monthly Cost Savings:[12] _____

Footnotes:

1) Meeting all the requirements in a Builder Option Package (BOP) qualifies an individual home as ENERGY STAR compliant. ENERGY STAR labeled homes are designed to use at least 15% less energy than homes built to Energy Codes in Oregon and Washington and 30% better than the HERS reference standard in the areas of heating, cooling, and domestic water heating combined. Homes built to BOP specifications must be verified by a RESNET-approved BOP provider, in accordance with the EPA/RESNET Agreement on BOPs (see www.natresnet.org/bop/agreement.htm). Additional efficiency and savings can be achieved by selecting other ENERGY STAR labeled products throughout the house (e.g., lighting, appliances). For more information, visit www.energystar.gov. Regardless of these specifications, all local codes must be followed.
2) Floors over unconditioned spaces, including floors over crawlspaces, shall be insulated to the level specified in the BOP. Effective U-factors for this application shall be developed from the SGC Heat Loss Reference Manual. It is the intent of this BOP that crawlspaces be insulated at the floor line.
3) Thermal requirements vary with local building codes. Ensure that insulation levels meet all relevant codes. The BOPs were developed for homes using wood framing. If metal framing is used, consult a local energy code official for steelframing requirements to determine additional upgrades necessary to achieve equivalent thermal performance, such as additional insulated sheathing. The insulation U-Factor of each component (i.e., attic, exterior wall, etc.) must meet or exceed the required level designated in the BOP. U-factors shall be drawn from the SGC Heat Loss Reference Manual or from the reference values in the energy code (e.g. WSEC Chapter 10). In BOP number 3 it is anticipated that the added wall R-value would be achieved by a layer of 1/2" rigid foam installed on the outside of the structural sheathing or beneath the interior wall board. For purposes of these paths the requirement for the wall R-values may also be met by R-21 insulation in a 2x6 "advanced frame" wall as defined by the SGC Heat Loss Reference Manual.
4) Install properly sized HVAC equipment. Use the document, "Performance Tested Comfort Systems - Air Source Heat Pump System Installation Standards October 1, 2003", for sizing with specific balance point sizing for heat pump coils. Sizing of back-up elements in heat pumps and all other furnace or zone heating systems shall be limited to 200% of design heat load calculation per Oregon and Washington Energy codes.
5) Maximum window to floor area (WFA) is a ratio of total window and skylight unit area to total gross conditioned floor area (CFA). For example, a house with total gross conditioned floor area of 2,000 square feet and total window and skylight area of 400 square feet has a WFA of 400/2,000 = 20%. Regardless of the maximum window and skylight area, up to 1% WFA may be used for windows with decorative glass (e.g., does not meet U-value or SHGC requirements).
6) Solar window screens may be used to meet SHGC requirements. The overall SHGC for a window unit with solar screen is determined by the following equation: [(window SHGC) x (solar screen SHGC) x (percent of area covered)] + [window SHGC x percent of area not covered]. For example, a window with a SHGC of 0.5, using a solar screen that provides 70% shading (the equivalent of 0.3 solar heat gain coefficient) and covers 60% of the window has an overall solar heat gain coefficient of [0.5 x 0.3 x 0.6] + [0.5 x 0.4] = 0.09 + 0.20 = 0.29.
7) Duct installation shall be in accordance with "Duct System Diagnostic Field Guide Revised Oct. 1, 2003" and shall be certified. The total duct leakage measured at 25 PA Fan pressure shall not exceed 6% (leakage CFM per total system CFM).
8) ASHRAE Standard 62-89 requires 0.35 ac/h of outdoor air (but not less than 15 CFM per person) to meet ventilation requirements for residential dwellings. The envelope tightness specified in this BOP shall be verified by a blower door test at each residence. For packages that recommend active ventilation systems, this ventilation system shall include an ENERGY STAR fan providing at least 50CFM of exhaust ventilation. For packages with less than 7.0 ACH50 required, a fully ducted air-to-air heat exchanger (HRV) shall be installed. The core efficiency of the HRV shall be a minimum of 70% and it shall be designed to provide 0.25 ac/h mechanical ventilation. The mechanical ventilation shall supplement the natural infiltration rate to provide the total required 0.35 ac/h to the residence. This may be done with continuous or intermittent schedules.
9) Programmable thermostats used in homes with heat pumps must have "ramp-up" technology to prevent the excessive use of electric back-up heating.
10) A minimum of R-8 duct insulation is recommended for ducts in conditioned space to prevent condensation.
11) Heat pump and air conditioning equipment installation shall be accomplished in accordance with the PTCS heat pump sizing and installation guidelines. Compliance with the installation guidelines will be assessed under the auspices of the local utility or through an approved certification agency. These guidelines and the agencies certified to assess compliance shall be approved by the Regional Technical Forum (RTF). The ARI rating of the equipment shall meet the requirements for an ENERGY STAR designation. All other electric heating allowed under these BOPs shall be zoned electric resistance heat only. No central electric furnaces shall be allowed.
12) Slab insulation shall be installed with an R-5 minimum thermal break in all cases. The thermal break may be located between the slab edge and the foundation/footing or outside the foundation protecting both the foundation stem wall and the slab edge. The R-10 required insulation shall extend under the entire slab when the home is constructed as a slab-on-grade system. When the slab is constructed below grade the R-10 can be installed as a perimeter insulation extending horizontially or vertically 2 feet from the slab edge. For purposes of this requirement the slab must be an average depth of at least 2 feet below finish grade to qualify as a below grade slab.
13) One door may be installed in each house (maximum of 28 square feet in area) that is exempted from this standard.

Notes:

a) The symbol " -- " means that the option is not available for that specific BOP.